

Supporting Information

Supplemental Table 1.

	mg/kg, $\mu\text{g/g}$ or ppm										
	K	Mg	Mn	Mo	Na	Ni	P	S	Se	Zn	
Oil 1 st press (Cold)	0.0	0.1	0.0	0.0	5.4	0.2	7.2	0.0	0.0	0.1	
Oil 2 nd press (Hot)	3.6	6.8	0.1	0.0	2.2	0.4	84.3	0.0	0.0	0.0	
Seed Meal After two presses	9676	2998	29.4	1.1	1743	0.9	6709	6085	1.6	50.3	
	mg/kg, $\mu\text{g/g}$ or ppm										
	Ag	Al	As	B	Ba	Ca	Cd	Co	Cr	Cu	Fe
Oil 1 st press (Cold)	0.2	0.0	0.0	0.0	0.0	2.6	0.2	0.0	0.8	0.0	0.0
Oil 2 nd press (Hot)	0.1	0.0	0.0	0.0	0.0	15.9	0.3	0.0	0.8	0.0	0.0
Seed Meal After two presses	0.2	12.0	0.0	34.4	0.5	3544	0.3	0.1	1.1	4.4	72.9

Data are mineral concentrations in the resulting oil and in seed meals after a cold press followed by a hot press.

Supplemental Table 2. Chemical speciation of total Se by micro-focused X-ray absorption near-edge structure (μXANES) spectroscopy in Brassica seed after feeding plants 20 μM selenate.

Figure 1. Panel		Norm. Sumsq (NSS)	Selenite	Gray Se ⁰	C-Se-C Forms
A.	<u>Canola</u> One multi scan	3.60E-04	ND	ND	99
B.	<u>Indian mustard</u> Two multi scans	4.02E-04 4.28E-04	ND ND	ND ND	100 99
C.	<u>White mustard</u> Two multi scans	4.11E-04 5.96E-04	ND ND	ND ND	99 100

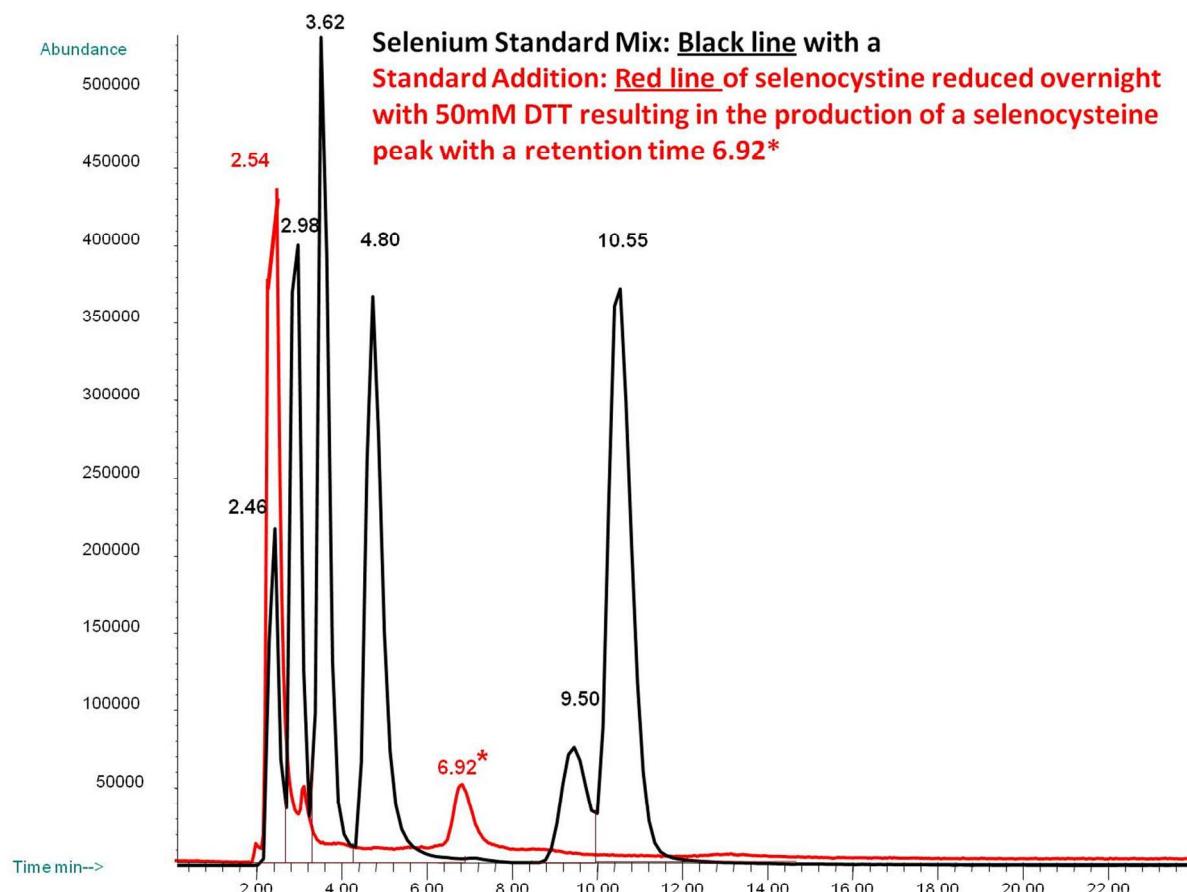
Results of the least-square linear combination fitting of Selenium K-edge XANES spectra. The best linear combination fit was obtained by minimizing the normalized sum-squares residuals [$\text{NSS} = 100 \times \sum(\mu_{\text{exp}} - \mu_{\text{fit}})^2 / \sum(\mu_{\text{exp}})^2$], where μ is the normalized absorbance. Error on percentages estimated to be $< \pm 10\%$. Selenite, Selenodiglutathione, Selenocysteine, selenocystine, and elemental Red Se⁰ were all not detected (ND). C-Se-C forms are as follows: Selenomethionine (SeMet), Methylselenocysteine (MeSeCys), gamma-glutamyl methylselenocysteine ($\gamma\text{GluMeSeCys}$) and Selenocystathionine (SeCyst).

Supplemental Table 3. Chemical speciation of soluble Se by SAX-HPLC-ICPMS in *Brassica* seed and seed meals harvested from fields in the WSJV.

Whole Ground Seeds		
<i>RT Min. (Canola)</i>	<i>% Soluble Selenium (Canola)</i>	<i>Selenium Compounds (Canola)</i>
2.54 ± 0.02	14.11 ± 2.71%	SelenoCystine
2.95 ± 0.06	20.56 ± 1.91%	MethylSelenoCysteine
4.45 ± 0.09	65.95 ± 0.09%	SelenoMethionine
<i>RT Min. (Indian mustard)</i>	<i>% Soluble Selenium (Indian mustard)</i>	<i>Selenium Compounds (Indian mustard)</i>
2.55 ± 0.01	17.00 ± 0.09%	SelenoCystine
2.97 ± 0.06	28.92 ± 1.77%	MethylSelenoCysteine
4.51 ± 0.08	31.37 ± 2.40%	SelenoMethionine
6.82 ± 0.21	23.48 ± 1.71%	SelenoCysteine
<i>RT Min. (White mustard)</i>	<i>% Soluble Selenium (White mustard)</i>	<i>Selenium Compounds (White mustard)</i>
2.54 ± 0.01	15.26 ± 1.4 %	SelenoCystine
2.90 ± 0.03	17.04 ± 1.01%	MethylSelenoCysteine
4.47 ± 0.10	33.68 ± 0.21%	SelenoMethionine
6.82 ± 0.19	14.18 ± 0.35%	SelenoCysteine
11.49 ± 1.03	19.64 ± 4.11%	Selenate
Seed Meals		
<i>RT Min. (Canola)</i>	<i>% Soluble Selenium (Canola)</i>	<i>Selenium Compounds (Canola)</i>
2.54 ± 0.02	7.49 ± 0.92%	SelenoCystine
2.95 ± 0.07	27.48 ± 6.43%	MethylSelenoCysteine
4.49 ± 0.09	55.01 ± 2.32%	SelenoMethionine
6.83 ± 0.05	10.01 ± 2.59%	SelenoCysteine
<i>RT Min. (Indian mustard)</i>	<i>% Soluble Selenium (Indian mustard)</i>	<i>Selenium Compounds (Indian mustard)</i>
2.53 ± 0.02	5.05 ± 1.08%	SelenoCystine
2.95 ± 0.06	20.21 ± 2.84%	MethylSelenoCysteine
4.45 ± 0.08	42.54 ± 4.80%	SelenoMethionine
6.77 ± 0.13	32.25± 6.88%	SelenoCysteine
<i>RT Min. (White mustard)</i>	<i>% Soluble Selenium (White mustard)</i>	<i>Selenium Compounds (White mustard)</i>
2.54 ± 0.02	12.10 ± 1.17%	SelenoCystine
2.94 ± 0.03	38.02 ± 1.09%	MethylSelenoCysteine
4.49 ± 0.11	38.11 ± 3.21%	SelenoMethionine
6.73 ± 0.13	18.48 ± 1.49%	SelenoCysteine
<i>RT Min. Standard Spiked</i>	<i>Selenium Standards</i>	
2.43 ± 0.02	SelenoCystathione	
2.54 ± 0.03	SelenoCystine	
2.92 ± 0.03	MethylSelenoCysteine	
3.13 ± 0.01	Selenomethionineselenoxide	
3.49 ± 0.01	Selenite	
4.53 ± 0.03	SelenoMethionine	
6.92 ± 0.12	SelenoCysteine	
8.82 ± 0.01	γ-glutamylMethylSelenoCysteine	
10.20 ± 0.02	Selenate	
16.1 ± 0.50	SelenodiGlutathione	

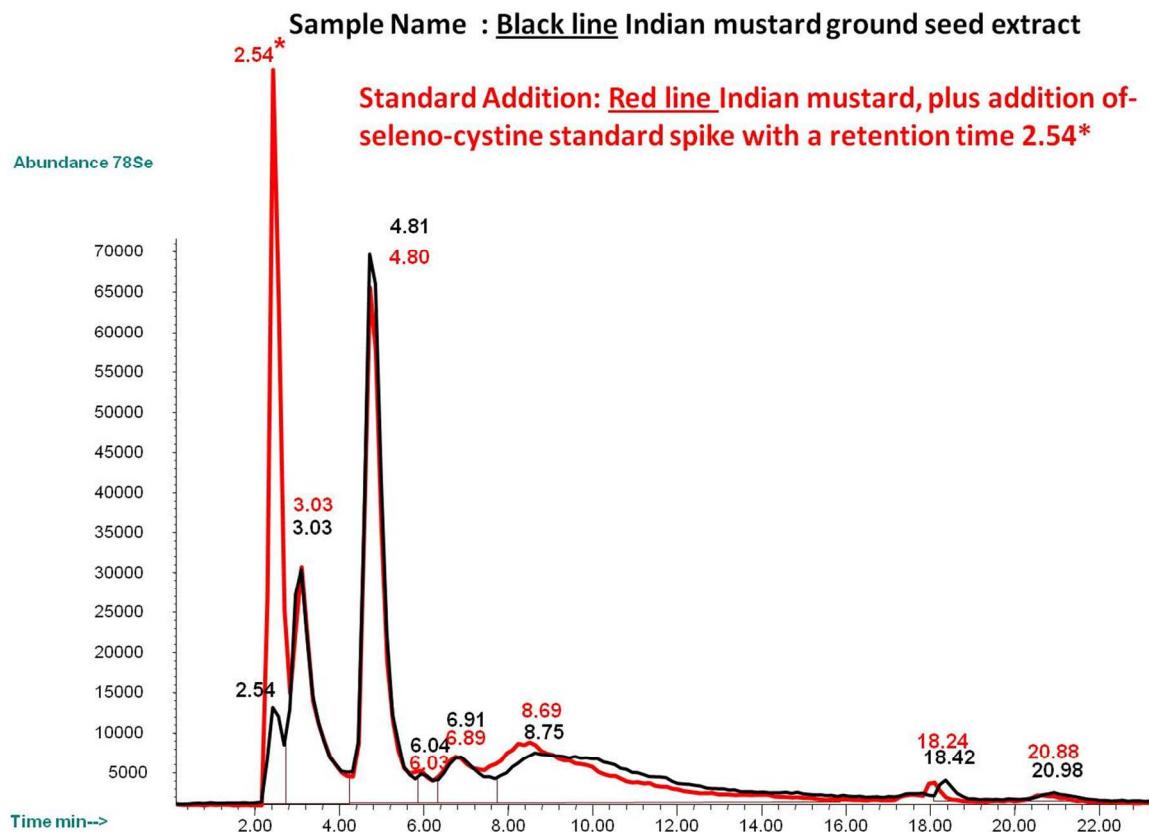
Data are mean percentages of total soluble Se ± standard deviation (SD) in methanol/water aqueous phase after proteinase XIV digestion and Methanol Choloroform Water (MCW) extraction. Soluble Se recovery percentages of total Se for whole ground seeds and seed meals were respectively as follows: canola 34%, 29%; Indian mustard 29%, 30%; white mustard 18%, 15%. Retention Time Minutes (RT Min.) ± SD. Seed meals are hydraulically-pressed under pressure at 83 -105 °C baked and ground.

Supplemental Figure 1. Standard Additions and Sample Peak Verification Experiment Follows



Instrument : Agilent ICP-MS,

Manufactureres Method File : Agilent SAX-HPLC-ICPMS of Organic and Inorganic Selenium Compounds

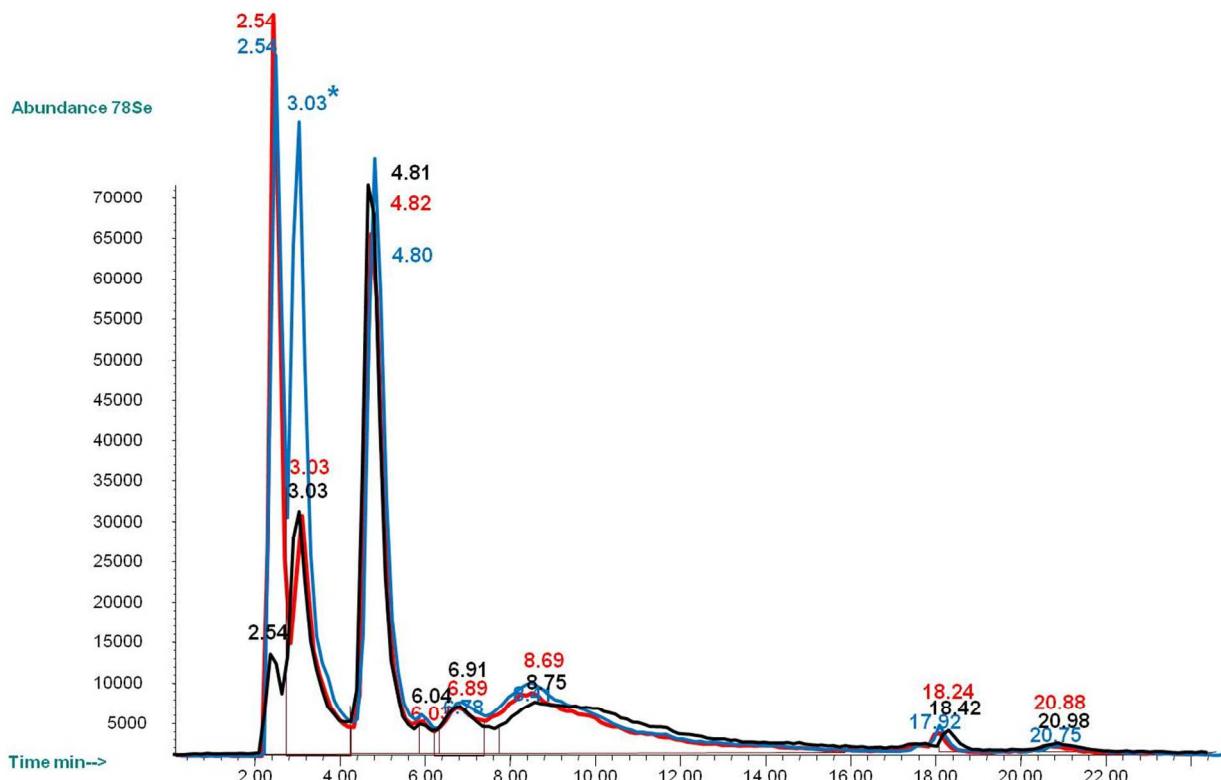


Sample Name : Black line Indian mustard ground seed extract

Standard Addition: Red line Indian mustard, plus addition of a seleno-cystine standard spike retention time 2.54

Standard Addition: Blue line Indian mustard, plus previous seleno-cystine standard spike retention time 2.54 ,

Followed by the addition of a methyl-seleno-cysteine standard spike with a retention time 3.03 *

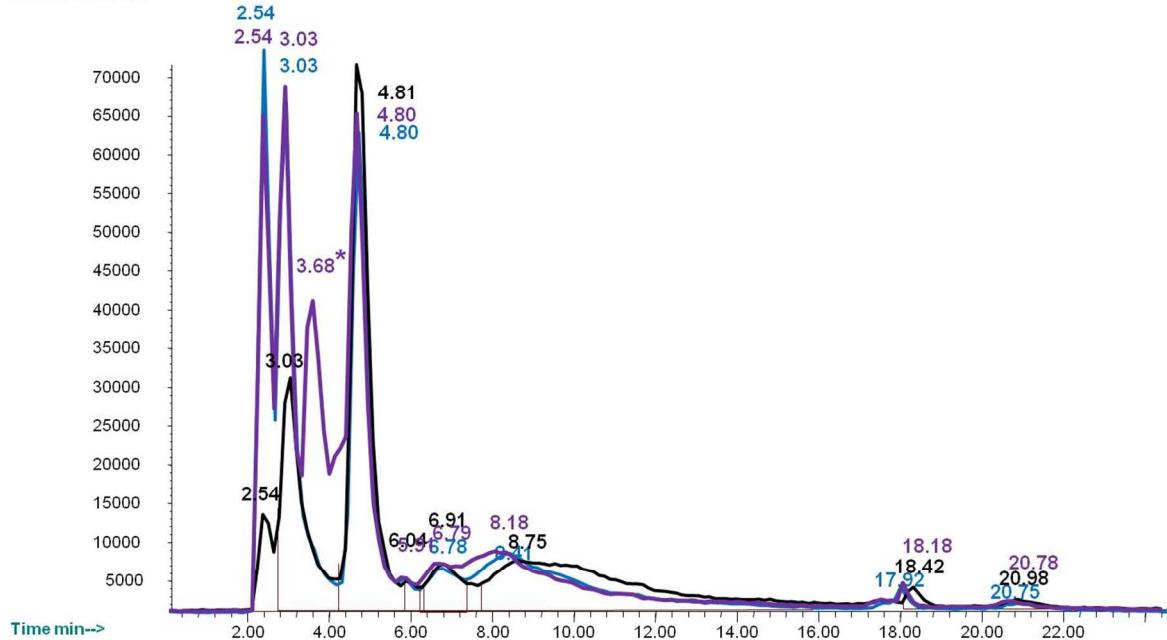


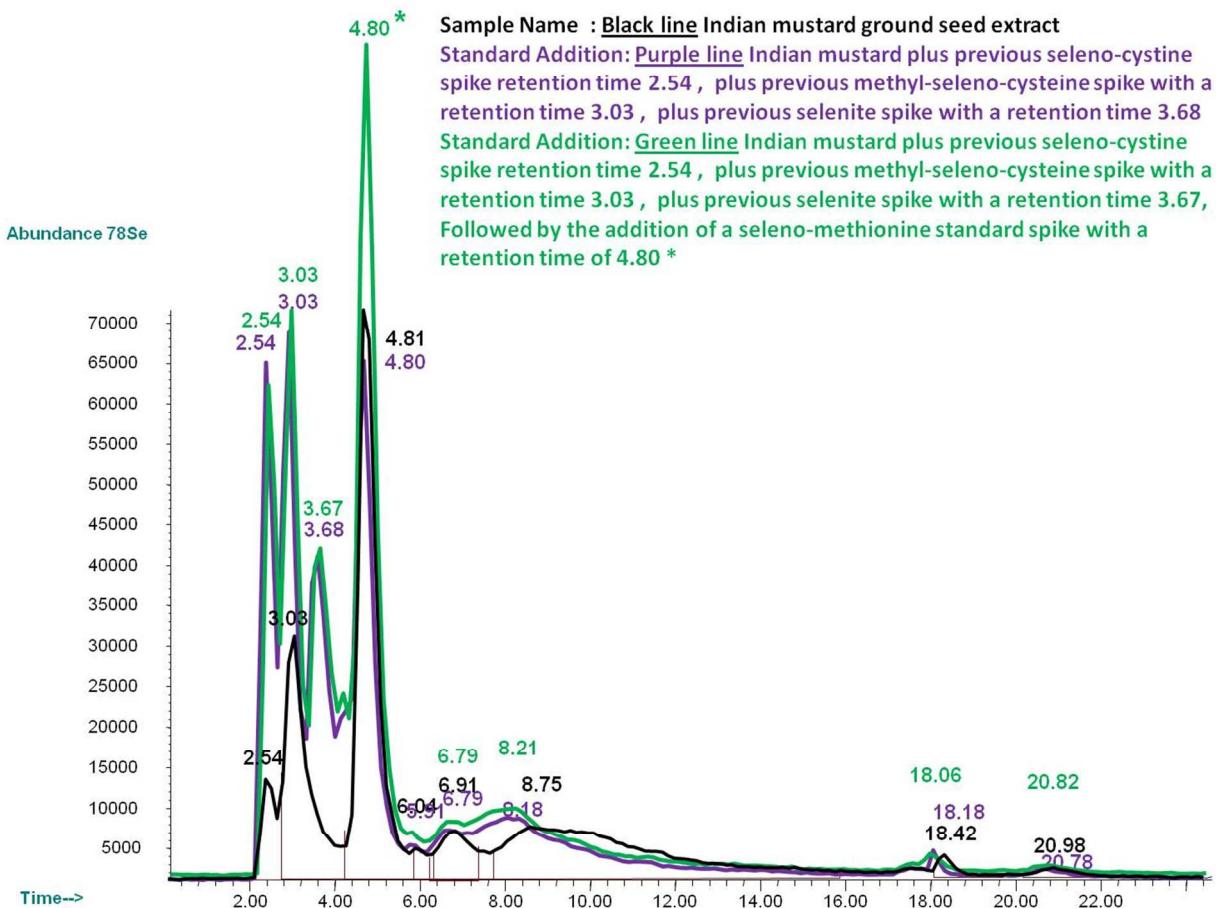
Sample Name : Black line Indian mustard ground seed extract

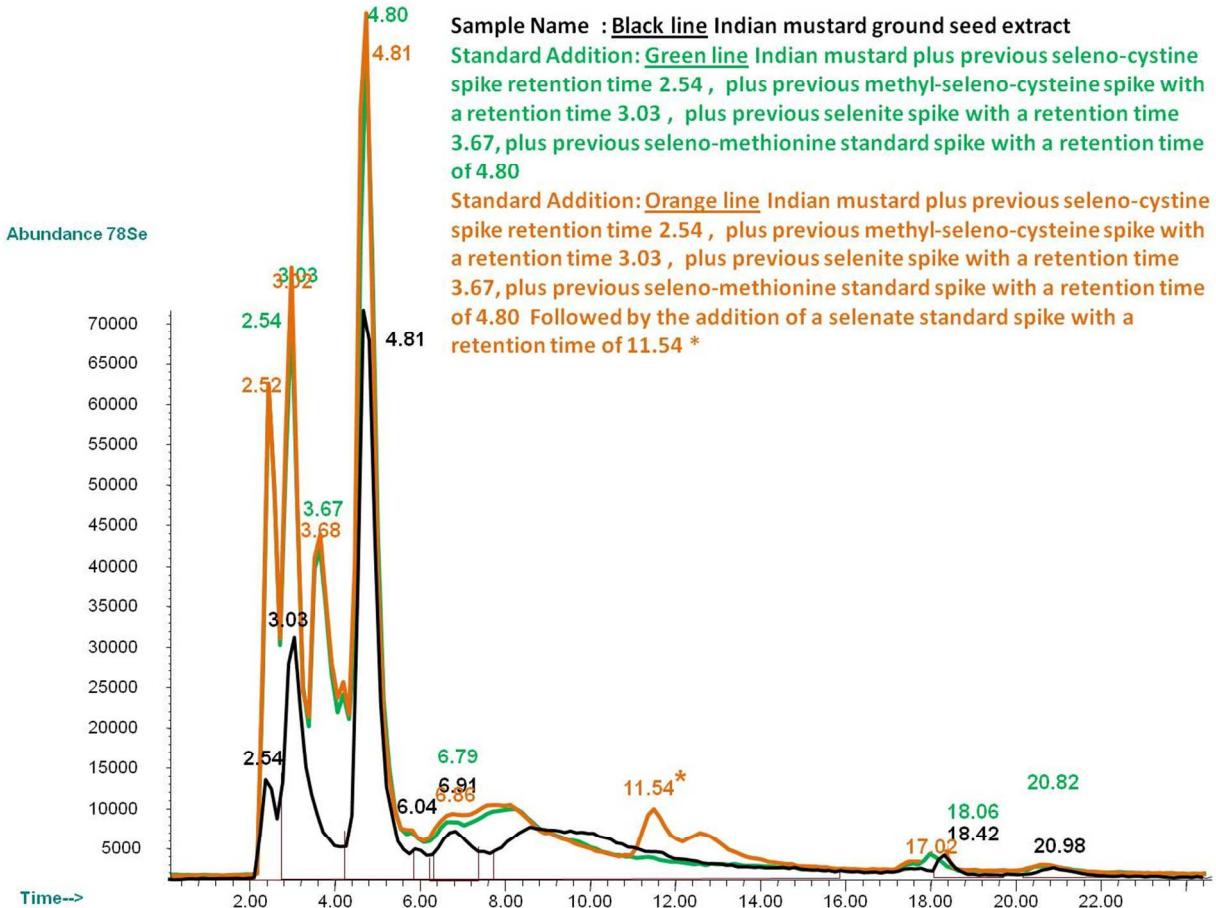
Standard Addition: Blue line Indian mustard plus previous seleno-cystine standard spike retention time 2.54 ,
plus the addition of a methyl-seleno-cysteine standard spike with a retention time 3.03

Standard Addition: Purple line Indian mustard plus previous seleno-cystine standard spike retention time 2.54 ,
plus the previous methyl-seleno-cysteine standard spike with a retention time 3.03 ,
Followed by the addition of a selenite standard spike with a retention time 3.68*

Abundance 78Se







Second Run Number 2.

Sample Name : Black line Indian mustard ground seed extract

**Standard Addition: Red line Indian mustard, plus addition of-
 γ -glutamyl-methyl-seleno-cysteine standard spike with a retention time 8.87 ***

